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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/699,188	10/27/2000	James H. Parry	21706-05327	6572
33438	7590	01/12/2005	EXAMINER	
HAMILTON & TERRILE, LLP			JAMAL, ALEXANDER	
P.O. BOX 203518			ART UNIT	
AUSTIN, TX 78720			PAPER NUMBER	
			2643	

DATE MAILED: 01/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/699,188	PARRY, JAMES H.	
	Examiner	Art Unit	
	Alexander Jamal	2643	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 November 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-45 and 47-52 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-45, 47-52 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendments

1. Based upon claims received 11-17-2004, examiner notes that no claims have been amended, added, or cancelled.
2. Examiner withdraws all previous claim rejections and submits a new set of claim rejections.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
2. **Claim 35** rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In the last line of the claim, the term 'sensing the audio signal' is used. It is not clear which audio signal (first or second) is being referred to. Examiner assumes that the phrase should read 'sensing the first audio signal'.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. **Claims 1-11,18-20,22-31,35-45**, rejected under 35 U.S.C. 102(b) as being anticipated by Dent et al. (5680450).

As per **claim 1**, Dent discloses an acoustic echo canceller (ABSTRACT) comprising first signal input 36 (Fig. 1), second signal input 20 and distortion module 21 that models the distortion of the first signal. The distorted signal is passed onto adder 22 in order to remove the echo from the second signal.

As per **claim 22**, claim rejected for same reasons as claim 1 rejection. The device of the claim 1 rejection performs the steps of applicant's claim 22.

As per **claim 35**, Dent discloses claim 35 for the same reasons as the claim 1 rejection. Additionally, Dent discloses that the distortion module may also comprise an audio sensing module that models the distortion occurring from sensing the audio signal (the D/A filter senses the audio signal) (Col 11 lines 15-45). Examiner also notes that, although the claim as written may be rejected by the Dent reference, the 'audio sensing module' may also be read as the distortion module that models the non-linear distortions of a microphone sensing audio signals, as such the claim would be rejected for the same reasons as the claim 52 rejection below.

As per **claims 2,25,36**, Dent's system is implemented digitally. As such the first and second audio signals would inherently bear sequencing information that would be used by all parts of the system (including the adder module) for the purpose of synchronizing the input audio signals with the echo estimation signal.

As per **claims 3-5**, claims rejected for same reasons as claims 1 and 35. Dent's system models the loudspeaker distortion (model 12 in Fig. 1).

As per **claims 6,40**, Dent's system operates in a standard communication system (Col 1 lines 15-25), as such the distortion modules must inherently alter the modeling path with real-time responsiveness for the purpose of allowing standard, real-time communication to occur between users of Dent's system.

As per **claims 7-10,27-31,37-39,41-44**, Dent discloses the use of a loudspeaker model that models all the non-linear distortions of playing a signal through the loudspeaker (Col 4 lines 55-65). The loudspeaker transfer function inherently (by definition of transfer function) models amplifier clipping on the first audio signal, voice coil displacement on sound waves produced by the loudspeaker, hysteresis in iron inductors on the first audio signal, and harmonic distortion on sound waves produced by the loudspeaker.

As per **claims 11,45**, Dent discloses a filter to account for the linear distortions on the second signal (Col 12 lines 15-45).

As per **claims 18,24**, the amplifier distortion module (DENT: Col 11, lines 20-30) models a pre-established distortion.

As per **claims 19,23**, Dent's system comprises an adaptive distortion module (modules 34,16 in Fig. 1).

As per **claim 20**, Dent's system models non-linear distortions (ABSTRACT).

As per **claim 26**, claim rejected for the same reasons as claim 22.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. **Claims 12-17, 32-34,47-51** rejected under 35 U.S.C. 103(a) as being unpatentable over Dent et al. (5680450) as applied to claims 1,22,26,35 and further in view of Kaizer et al. (4709391).

As per **claims 12,32,47**, Dent discloses applicant's claims 1,22,26,35, however Dent does not disclose a distortion module that models the microphone sensing on the first signal.

Kaizer teaches that both electroacoustic (loudspeakers) and acoustoelectric (microphones) (ABSTRACT) may be modeled with a non-linear network comprising multiple distortion modules (each one modeling a different distortion transfer function)

(KAIZER: Col 12 line 13 to Col 13 line 13). He teaches that the model structure will may be used in systems to help reduce the distortion inherent to the transducers (both microphones and loudspeakers and take into account any amplifier clipping (KAIZER: Col 1 lines 33-60). Dent discloses an embodiment of his echo canceller in which the distortion module comprises a filter for the acoustic path modeling of the non-linear aspects of the sound pressure wave (DENT: Col 12 lines 15-50). It would have been obvious to one of ordinary skill in the art at the time of this application that the microphone (and any associated amplifiers) could be modeled for the non-linear distortions, and those distortions used in the echo canceller structure in addition to modeling the loudspeaker distortions for the purpose of further reducing the non-linear distortions in the system when canceling the echoes of the acoustically coupled signal.

As per **claims 13,14,48**, Dent's system comprises an additional module (model 34, Fig. 1) to model the echo distortion on the second audio signal.

As per **claims 15,49**, claim rejected for same reasons as claim 6.

As per **claims 16,33,50**, Dent in view of Kaizer discloses the use of a microphone model to model all the non-linear distortions of sensing the audio signal. The non-linear distortions of a microphone includes microphone centerclipping.

As per **claims 17,34,51**, Dent discloses the modeling of the audio amplifier responses (Col 11 lines 17-32) that would include the amplifier zero-crossing.

7. **Claim 21** rejected under 35 U.S.C. 103(a) as being unpatentable over Dent et al. (5680450) as applied to claim 1, and further in view of McLaughlin (5526426).

As per **claim 21**, Dent discloses applicant's claim 1, however Dent does not disclose the distortion modules operating in the frequency domain.

McLaughlin discloses an echo canceller with distortion module 10 (Fig. 1) that operates in the Frequency domain (ABSTRACT). McLaughlin teaches that processing in the frequency domain is less computationally complex than processing in the time domain (Col 2 lines 15-45). It would have been obvious to one of ordinary skill in the art at the time of this application that the distortions could be modeled in the frequency domain for the advantage of reduced computational complexity.

8. **Claim 52** rejected under 35 U.S.C. 103(a) as being unpatentable over Dent et al. (5680450), and further in view of Kaizer et al. (4709391).

As per **claim 52**, claim rejected for same reasons as claim 35 rejection. However, Dent does not disclose that the distortion module takes into account the distortion introduced by the sensing of sound waves with the microphone.

Kaizer teaches that both electroacoustic (loudspeakers) and acoustoelectric (microphones) (ABSTRACT) may be modeled with a non-linear network comprising multiple distortion modules (each one modeling a different distortion transfer function) (KAIZER: Col 12 line 13 to Col 13 line 13). He teaches that the model structure will

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may be used in systems to help reduce the distortion inherent to the transducers (both microphones and loudspeakers and take into account any amplifier clipping (KAIZER: Col 1 lines 33-60). Dent discloses an embodiment of his echo canceller in which the distortion module comprises a filter for the acoustic path modeling of the non-linear aspects of the sound pressure wave (DENT: Col 12 lines 15-50). It would have been obvious to one of ordinary skill in the art at the time of this application that the microphone (and any associated amplifiers) could be modeled for the non-linear distortions, and those distortions used in the echo canceller structure in addition to modeling the loudspeaker distortions for the purpose of further reducing the non-linear distortions in the system when canceling the echoes of the acoustically coupled signal.

Response to Arguments

9. As per applicant's arguments (received 11-17-2004) regarding the Applicant's request for reconsideration of the finality of the rejection of the last Office Action based upon the 112 First Paragraph rejection of **claims 1-34** is persuasive and, therefore, the finality of that action is withdrawn.


10. Applicant's arguments with respect to **claims 35-52** have been considered but are moot in view of the new ground(s) of rejection.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander Jamal whose telephone number is 703-305-3433. The examiner can normally be reached on M-F 8AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis A Kuntz can be reached on 703-305-4708. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9306 for regular communications and 703-872-9315 for After Final communications.

AJ
December 28, 2004


CURTIS KUNTZ
SUPERVISORY PATENT EXAMINER
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